

**FULL VERSION OF PENDING CLAIMS**

1       Claim 1 (Currently Amended): A carbonaceous refractory material containing 50 to  
2       85-% (‘‘%’’ means ‘‘by mass’’) of carbon, 5 to 15-% by mass of alumina refractory metal  
3       oxide, 5 to 15-% by mass of metallic silicon, and 5 to 20-% by mass in total of at least one or two  
4       or more material(s) out of selected from the group consisting of metallic titanium, titanium  
5       carbide, titanium nitride and titanium carbonitride ( $TiC_xN_y$ , where  $0 < x, y < 1$  and  $x + y = 1$ ),  
6       where the X-ray diffraction peak intensity ratio of the face (200) of the  $Ti_3O_5$  to  
7       the face (111) of titanium carbide is 1% or less.

*from claim 3 not supported though, for  
any refractory oxide!*

1       Claim 2 (Currently Amended): A method for producing a carbonaceous refractory  
2       material by compounding 50-to 85% by mass of carbonaceous materials, as main raw materials,  
3       which are calcined anthracite, calcined coke, natural graphite, artificial graphite or these mixture,  
4       new marks  
5       with 5-to 15% by mass of alumina refractory metal oxide, 5-to 15% by mass of metallic silicon  
6       and 5-to 20% by mass in total of at least one or two or more material(s) out of selected from the  
7       group consisting of metallic titanium, titanium carbide, titanium nitride, and titanium  
8       carbonitride ( $TiC_xN_y$ , where  $0 < x, y < 1$  and  $x + y = 1$ ), and by adding organic binder to the  
9       mixture, then kneading, forming and baking in non-oxidation atmosphere to obtain the  
carbonaceous refractory materials in the first claim of the invention,

10       where the X-ray diffraction peak intensity ratio of the face (200) of the  $Ti_3O_5$  to  
11       the face (111) of titanium carbide is 1% or less.

1       Claim 3 (Cancelled)

1 Claim 4 (Currently Amended): The carbonaceous refractory material in the first of claim  
2 1, where a part or the whole of the refractory metal oxide contains at least one selected from the  
3 group consisting of alumina, is replaced by one or two or more material(s) out of zircon,  
4 magnesia, mullite, spinel and silica.

*Nice try*

1 Claim 5 (Currently Amended): The method of producing the carbonaceous refractory  
2 material in the second of claim 2, where a part or the whole of the refractory metal oxide  
3 contains at least one selected from the group consisting of alumina, is replaced by one or two or  
4 more material(s) out of zircon, magnesia, mullite, spinel and silica.

1 Claim 6 (Cancelled)

*It is observed that a protective layer with a high melting pt., in which a small amt of Ti dissolve therein, stick to the whole surface of the carbonaceous refractory material of the next*

1 Claim 7 (New): The carbonaceous refractory material of claim 1, wherein the 5 to 20% by mass in total of at least one selected from the group  
2 wherein the 5 to 20% by mass in total of at least one selected from the group  
3 consisting of metallic titanium, titanium carbide, titanium nitride and titanium carbonitride  
4  $TiC_xN_y$ , where  $0 < x, y < 1$  and  $x + y = 1$ , enables the formation of a high melting protective layer  
5 bound to the carbonaceous refractory material.

*P. 14  
1115/6/9*

*112 Point ??  
Need  
Weld  
Point  
→ in which small amt of  
Ti dissolve in,*

1 Claim 8 (New): The method of producing the carbonaceous refractory material of claim  
2 2,  
3 wherein the 5 to 20% by mass in total of at least one selected from the group  
4 consisting of metallic titanium, titanium carbide, titanium nitride and titanium carbonitride  
5  $TiC_xN_y$ , where  $0 < x, y < 1$  and  $x + y = 1$ , enables the formation of a high melting protective layer  
6 is formed in the proximity of the refractory material surface. *new matter*

*only support for - A protective layer with a high melting pt was recognized,  
which is formed at the interface between mottled pig iron & the surface*

1       Claim 9 (New): An improved durable carbonaceous refractory material for lining the  
2 side walls and bottom region of a blast furnace hearth, the improved durable carbonaceous  
3 refractory material having a reduced carburization dissolution rate and an increased wettability  
4 with molten iron to yield excellent corrosion resistance properties, the improvement consisting  
5 essentially of:

6               50 to 85% by mass of carbon;

7               5 to 15% by mass of a refractory metal oxide, the refractory metal oxide contains  
8 at least one selected from the group consisting of alumina, zircon, magnesia, mullite, spinel and  
9 silica, the refractory metal oxide being present in a sufficient amount to form a residual  
10 refractory metal oxide layer in proximity to the surface of the carbonaceous refractory materials  
11 even after dissolution of the carbon aggregates and to stay between the carbonaceous refractory  
12 material and molten iron to prevent the contact between the carbonaceous refractory material and  
13 the molten iron, thereby reducing the consumption of the carbonaceous refractory materials;

14               5 to 15% by mass of metallic silicon; and

15               5 to 20% by mass in total of at least one metallic titanium or titanium compound  
16 selected from the group consisting of metallic titanium Ti, titanium carbide TiC, titanium nitride  
17 TiN, titanium carbonitride  $TiC_{0.7}N_{0.3}$ , and titanium carbonitride  $TiC_{0.3}N_{0.7}$ , the metallic titanium  
18 or titanium compound being present in an amount to sufficiently cover the whole surface of the  
19 carbonaceous refractory material which is not sufficiently supplied by the residual refractory  
20 metal oxide layer after the dissolution of the carbon aggregate, such that a durable and  
21 economical covering layer is formed, the metallic titanium or titanium compound allowing  
22 improved wettability with molten iron,

23 wherein the X-ray diffraction peak intensity ratio of the face (200) of the  $Ti_3O_5$  to  
24 the face (111) of titanium carbide is 1% or less.

1 1 Claim 10 (New): The improved durable carbonaceous refractory material of Claim 9,

2 *new matter* wherein the particle size of the refractory metal oxide being sized in the range of  
3 approximately 2  $\mu m$  to 3  $\mu m$ .

*↑ new matter, only support for particle size  
of "alumina" of 2 to 3  $\mu m$ . See p. 23*

1 1 *IP24* Claim 11 (New): The improved durable carbonaceous refractory material of Claim 9,

5 wherein the particle size of the metallic silicon being sized in the range of

6 approximately 1  $\mu m$  to 74  $\mu m$ . *no support for 1  $\mu m$  or "approximately" only support for "74  $\mu m$   
or less" see p. 23 spec*

7 Claim 12 (New): The improved durable carbonaceous refractory material of Claim 9,

8 wherein the particle size of the metallic titanium and titanium compounds being

9 sized approximately 7  $\mu m$ .

*new matter only support for 7  $\mu m$  → spec says "were 7  $\mu m$ "  
not were approx 7  $\mu m$*

*see p. 23*

*that's a big  
difference  
to support  
sorry*